



CLOUD COMPUTING

::

LAB # 13

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LAB OBJECTIVE:

- INSTALL AND CONFIGURE NOVA OPENSTACK ROCKY UBUNTU:

STEP 1

- CREATE DATABASES:

```
aaaa@controller:~$ sudo su -
root@controller:~# mysql
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 46
Server version: 10.1.48-MariaDB-0ubuntu0.18.04.1 Ubuntu 18.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> CREATE DATABASE nova_api;
Query OK, 1 row affected (0.00 sec)
```

```
MariaDB [(none)]> CREATE DATABASE nova;
Query OK, 1 row affected (0.00 sec)

MariaDB [(none)]> CREATE DATABASE nova_cell0;
Query OK, 1 row affected (0.00 sec)

MariaDB [(none)]> CREATE DATABASE placement;
Query OK, 1 row affected (0.00 sec)
```

STEP 2

- GRANT PERMISSIONS:

```
MariaDB [(none)]> GRANT ALL PRIVILEGES ON nova_api.* TO 'nova'@'localhost' IDENTIFIED BY 'novaDBPass';
Query OK, 0 rows affected (0.00 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON nova_api.* TO 'nova'@'%' IDENTIFIED BY 'novaDBPass';
Query OK, 0 rows affected (0.01 sec)
```


STEP 4

- Add the admin role to the nova user:
- Create the nova service entity:

```
aaaa@controller:~$ openstack role add --project service --user nova admin
aaaa@controller:~$ openstack service create --name nova --description "The Skill
Pedia OpenStack Compute" compute
+-----+-----+
| Field      | Value                                     |
+-----+-----+
| description | The SkillPedia OpenStack Compute       |
| enabled     | True                                    |
| id          | 4d086719e63249flaal3c4459593c7b0     |
| name        | nova                                    |
| type        | compute                                 |
+-----+-----+
aaaa@controller:~$
```

- Do this for public.

```
aaaa@controller:~$ openstack endpoint create --region RegionOne compute public h
ttp://controller:8774/v2.1
+-----+-----+
| Field      | Value                                     |
+-----+-----+
| enabled     | True                                    |
| id          | bb90f16321db44839eb14feb83c40cba     |
| interface    | public                                 |
| region      | RegionOne                              |
| region_id   | RegionOne                              |
| service_id  | 4d086719e63249flaal3c4459593c7b0     |
| service_name | nova                                    |
| service_type | compute                                 |
| url         | http://controller:8774/v2.1           |
+-----+-----+
```

- For internal:

```
aaaa@controller:~$ openstack endpoint create --region RegionOne compute internal
http://controller:8774/v2.1
```

| Field | Value |
|--------------|----------------------------------|
| enabled | True |
| id | 8c6d89afd83d495d93742732b3596359 |
| interface | internal |
| region | RegionOne |
| region_id | RegionOne |
| service_id | 4d086719e63249flaal3c4459593c7b0 |
| service_name | nova |
| service_type | compute |
| url | http://controller:8774/v2.1 |

- For admin:

```
aaaa@controller:~$ openstack endpoint create --region RegionOne compute admin http://controller:8774/v2.1
```

| Field | Value |
|--------------|----------------------------------|
| enabled | True |
| id | d24770b3eb684d35b0d838ebc78e3280 |
| interface | admin |
| region | RegionOne |
| region_id | RegionOne |
| service_id | 4d086719e63249flaal3c4459593c7b0 |
| service_name | nova |
| service_type | compute |
| url | http://controller:8774/v2.1 |

```
aaaa@controller:~$
```

- Do this for placement:

```

aaaa@controller:~$ openstack user create --domain default --password-prompt plac
ement
User Password:
Repeat User Password:
+-----+-----+
| Field          | Value                                     |
+-----+-----+
| domain_id      | default                                 |
| enabled        | True                                   |
| id             | b66b3c79ad064a198029021625488166      |
| name           | placement                               |
| options        | {}                                     |
| password_expires_at | None                                 |
+-----+-----+
aaaa@controller:~$

```

STEP 5

- **ADD USER IN PLACEMENT:**

- For public.
- For internal.
- For admin.

```

aaaa@controller:~$ openstack role add --project service --user placement admin
aaaa@controller:~$ openstack service create --name placement --description "Plac
ement API" placement
+-----+-----+
| Field          | Value                                     |
+-----+-----+
| description     | Placement API                           |
| enabled        | True                                   |
| id             | 6fcd819b3d354085995973aad908eaal      |
| name           | placement                               |
| type           | placement                               |
+-----+-----+

```

```
aaaa@controller:~$ openstack endpoint create --region RegionOne placement public
http://controller:8778
```

| Field | Value |
|--------------|----------------------------------|
| enabled | True |
| id | 860d6ac32dd041b696d985ddaa702d88 |
| interface | public |
| region | RegionOne |
| region_id | RegionOne |
| service_id | 6fcd819b3d354085995973aad908eaal |
| service_name | placement |
| service_type | placement |
| url | http://controller:8778 |

```
aaaa@controller:~$
```

```
aaaa@controller:~$ openstack endpoint create --region RegionOne placement intern
al http://controller:8778
```

| Field | Value |
|--------------|----------------------------------|
| enabled | True |
| id | 8dd703efe87b46fd9c3ad2cf39f6569f |
| interface | internal |
| region | RegionOne |
| region_id | RegionOne |
| service_id | 6fcd819b3d354085995973aad908eaal |
| service_name | placement |
| service_type | placement |
| url | http://controller:8778 |

```
aaaa@controller:~$
```

```
aaaa@controller:~$ openstack endpoint create --region RegionOne placement admin
http://controller:8778
```

| Field | Value |
|--------------|----------------------------------|
| enabled | True |
| id | 3318a1b14da94067b7872b686d71f787 |
| interface | admin |
| region | RegionOne |
| region_id | RegionOne |
| service_id | 6fcd819b3d354085995973aad908eaal |
| service_name | placement |
| service_type | placement |
| url | http://controller:8778 |

```
aaaa@controller:~$
```

STEP 6

- **INSTALL THESE PACKAGES:**

```
root@controller:~# sudo apt install nova-api nova-conductor nova-novncproxy nova-scheduler nova-placement-api nova-common
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  augeas-lenses cpu-checker dconf-gsettings-backend dconf-service fontconfig
  fontconfig-config fonts-dejavu-core glib-networking glib-networking-common
  glib-networking-services gsettings-desktop-schemas gstreamer1.0-plugins-base
  gstreamer1.0-plugins-good gstreamer1.0-x ibverbs-providers ipxe-qemu
  ipxe-qemu-256k-compatible-efi-roms libaal libasound2 libasound2-data libasyncns0
  libaugeas0 libavahi-client3 libavahi-common-data libavahi-common3 libavc1394-0
  libbluetooth3 libbrlapi0.6 libcaca0 libcacard0 libcairo-gobject2 libcairo2
  libcdparanoia0 libdatriel libdconf1 libdv4 libfdt1 libflac8 libfontconfig1
  libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgraphite2-3
  libgstreamer-plugins-base1.0-0 libgstreamer-plugins-good1.0-0
  libgstreamer1.0-0 libgudev-1.0-0 libharfbuzz0b libibverbs1 libiec61883-0
  libiscsi7 libjack-jackd2-0 libjs-swfobject libmp3lame0 libmpeg123-0 libnetcf1
  libnl-route-3-200 libogg0 libopus0 liborc-0.4-0 libpango-1.0-0
  libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0 libpixman-1-0 libproxylv5
  libpulse0 librados2 libraw1394-11 librbdl librdmacm1 libsamplerate0
  libsd1.2debian libshout3 libsndfile1 libsoup2.4-1 libspeex1 libspice-server1
  libtag1v5 libtag1v5-vanilla libthai-data libthai0 libtheora0 libtwolame0
  libusbredirparser1 libv4l-0 libv4lconvert0 libvirt-daemon
  libvirt-daemon-driver-storage-rbd libvirt0 libvisual-0.4-0 libvorbis0a
  libvorbisenc2 libvpx5 libwavpack1 libxcb-render0 libxcb-shm0 libxdamage1
  libxen-4.9 libxenstore3.0 libxfixes3 libxml2-utils libxrender1 libxv1 libyajl2
  msr-tools novnc python-libvirt python-microversion-parse python-nova
```

```
Processing triggers for systemd (237-3ubuntu10.57) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for ureadahead (0.100.0-21) ...
Processing triggers for install-info (6.5.0.dfsg.1-2) ...
Processing triggers for libglib2.0-0:amd64 (2.56.4-0ubuntu0.18.04.9) ...
Processing triggers for sgml-base (1.29) ...
Processing triggers for libc-bin (2.27-3ubuntu1.6) ...
Setting up glib-networking:amd64 (2.56.0-1ubuntu0.1) ...
Setting up libfontconfig1:amd64 (2.12.6-0ubuntu2) ...
Setting up libsoup2.4-1:amd64 (2.62.1-1ubuntu0.4) ...
Setting up fontconfig (2.12.6-0ubuntu2) ...
Regenerating fonts cache... done.
Setting up libcairo2:amd64 (1.15.10-2ubuntu0.1) ...
Setting up libcairo-gobject2:amd64 (1.15.10-2ubuntu0.1) ...
Setting up libpango-1.0-0:amd64 (1.40.14-1ubuntu0.1) ...
Setting up libtheora0:amd64 (1.1.1+dfsg.1-14) ...
Setting up libshout3:amd64 (2.4.1-2build1) ...
Setting up gstreamer1.0-plugins-base:amd64 (1.14.5-0ubuntu1~18.04.3) ...
Setting up libpangoft2-1.0-0:amd64 (1.40.14-1ubuntu0.1) ...
Setting up gstreamer1.0-plugins-good:amd64 (1.14.5-0ubuntu1~18.04.3) ...
Setting up libpangocairo-1.0-0:amd64 (1.40.14-1ubuntu0.1) ...
Setting up gstreamer1.0-x:amd64 (1.14.5-0ubuntu1~18.04.3) ...
Processing triggers for libc-bin (2.27-3ubuntu1.6) ...
root@controller:~#
```


STEP 7

- MAKE CHANGES IN “NOVA.CONF” FILE:

```
root@controller:~# vim /etc/nova/nova.conf
```

```
[database]
#connection = sqlite:///var/lib/nova/nova.sqlite
connection = mysql+pymysql://nova:novaDBPass@controller/nova
#
# From oslo.db
#
```

```
[api_database]
#connection = sqlite:///var/lib/nova/nova_api.sqlite
connection = mysql+pymysql://nova:novaDBPass@controller/nova_api
```

```
# The SQLAlchemy connection string to use to connect to the database. (string
# value)
#connection = <None>
connection = mysql+pymysql://placement:placementDBPass@controller/placement
```

```
[DEFAULT]
log_dir = /var/log/nova
lock_path = /var/lock/nova
state_path = /var/lib/nova
transport_url = rabbit://openstack:rabbitPass@controller
my_ip = 10.0.0.11
use_neutron = true
firewall_driver = nova.virt.firewall.NoopFirewallDriver
```

```
[api]
#
# Options under this group are used to define Nova API.
#
# From nova.conf
#
# This determines the strategy to use for authentication: keystone or noauth2.
# 'noauth2' is designed for testing only, as it does no actual credential
# checking. 'noauth2' provides administrative credentials only if 'admin' is
# specified as the username.
# (string value)
# Possible values:
# keystone - <No description provided>
# noauth2 - <No description provided>
#auth_strategy = keystone
auth_strategy = keystone
```

```
# Deprecated group/name - [keystone_authtoken]/auth_uri
#www_authenticate_uri = <None>
auth_url =http://controller:5000/v3
memcached_servers = controller:11211
auth_type = password
project_domain_name = default
user_domain_name = default
project_name = service
username =nova
password =novaPass
```

```
# Enable VNC related features.
#
# Guests will get created with graphical devices to support this. Clients
# (for example Horizon) can then establish a VNC connection to the guest.
# (boolean value)
# Deprecated group/name - [DEFAULT]/vnc_enabled
#enabled = true
enabled = true
server_listen = $my_ip
server_proxyclient_address = $my_ip
```

```
#api_servers = <None>

api_servers = http://controller:9292
#
# Enable glance operation retries.
#
# Specifies the number of retries when uploading / downloading
# an image to / from glance. 0 means no retries.
# (integer value)
" ... "
```

```
# Directory to use for lock files. For security
# only be writable by the user running the process
# to environment variable OSLO_LOCK_PATH. If external
# path must be set. (string value)
#lock_path = <None>
lock_path = /var/lib/nova/tmp

[oslo_messaging_amqp]

#
# From oslo.messaging
-- INSERT --
```

```
[placement]
os_region_name = openstack
region_name = RegionOne
project_domain_name = Default
project_name = service
auth_type = password
user_domain_name = Default
auth_url = http://controller:5000/v3
username = placement
password = placementPass
#
# From nova.conf
#
#
```

STEP 8

- **POPULATE THE DATABASES:**

```

root@controller:~# vim /etc/nova/nova.conf
root@controller:~# su -s /bin/sh -c "nova-manage cell_v2 map_cell0" nova
root@controller:~# su -s /bin/sh -c "nova-manage cell_v2 create_cell --name=cell1 --verbose" nova
609f5d52-10f2-440a-b6fd-08f6aeba0b08
root@controller:~# su -s /bin/sh -c "nova-manage db sync" nova
/usr/lib/python2.7/dist-packages/pymysql/cursors.py:165: Warning: (1831, u'Duplicate index 'block_device_mapping_instance_uuid_virtual_name_device_name_idx'. This is deprecated and will be disallowed in a future release.')
  result = self._query(query)
/usr/lib/python2.7/dist-packages/pymysql/cursors.py:165: Warning: (1831, u'Duplicate index 'uniq_instances0uuid'. This is deprecated and will be disallowed in a future release.')
  result = self._query(query)

```

STEP 9

- CHECK THE TABLES:

```

root@controller:~# mysql
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 42
Server version: 10.1.48-MariaDB-0ubuntu0.18.04.1 Ubuntu 18.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> use nova;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

```

```
MariaDB [nova]> show tables;
```

```

+-----+
| Tables_in_nova |
+-----+
| agent_builds   |
| aggregate_hosts |
| aggregate_metadata |
| aggregates     |
| allocations    |
| block_device_mapping |
| bw_usage_cache |
| cells          |
| certificates    |
| compute_nodes  |
| console_auth_tokens |
| console_pools  |
| consoles       |
| dns_domains    |
| fixed_ips      |
| floating_ips   |
| instance_actions |
| instance_actions_events |
| instance_extra  |
| instance_faults |
| instance_group_member |
| instance_group_policy |
| instance_groups |
| instance_id_mappings |
| instance_info_caches |
| instance_metadata |
+-----+

```

```
| shadow_services |
| shadow_snapshot_id_mappings |
| shadow_snapshots |
| shadow_task_log |
| shadow_virtual_interfaces |
| shadow_volume_id_mappings |
| shadow_volume_usage_cache |
| snapshot_id_mappings |
| snapshots |
| tags |
| task_log |
| virtual_interfaces |
| volume_id_mappings |
| volume_usage_cache |
+-----+
110 rows in set (0.00 sec)
```

STEP 10

- GENERATE TOKENS:

```
root@controller:~# su -s /bin/sh -c "nova-manage cell_v2 list_cells" nova
+-----+-----+-----+-----+-----+
| Name | UUID | Transport URL | Database Connection | Disabled |
+-----+-----+-----+-----+-----+
| cell0 | 00000000-0000-0000-0000-000000000000 | none:/ | mysql+pymysql://nova:****@controller/nova_cell0 | False |
| cell1 | 609f5d52-10f2-440a-b6fd-08f6aeba0b08 | rabbit://openstack:****@controller | mysql+pymysql://nova:****@controller/nova | False |
+-----+-----+-----+-----+-----+
root@controller:~#
```

STEP 11

- Restart these services.
- Enable the services.

```
root@controller:~# service nova-api restart
root@controller:~# service nova-scheduler restart
root@controller:~# service nova-conductor restart
root@controller:~# service nova-novncproxy restart
root@controller:~#
```

```
root@controller:~# systemctl enable nova-api
Synchronizing state of nova-api.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable nova-api
root@controller:~# ^C
root@controller:~# systemctl enable nova-scheduler
Synchronizing state of nova-scheduler.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable nova-scheduler
root@controller:~# systemctl enable nova-conductor
Synchronizing state of nova-conductor.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable nova-conductor
root@controller:~# systemctl enable nova-novncproxy
Synchronizing state of nova-novncproxy.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable nova-novncproxy
root@controller:~#
```

- Open the dashboard horizon.



The image shows the OpenStack Horizon login interface. At the top is the OpenStack logo (a red square with a white 'O' inside) and the word 'openstack.' in a large, bold, sans-serif font. Below this is the text 'Log in'. The form contains three input fields: 'Domain' with 'Default' selected, 'User Name' with 'admin' entered, and 'Password' with a masked password '*****' and a toggle icon. A blue 'Sign In' button is located at the bottom right of the form.

STEP 12

- Check the service list.
- Generate tokens by ID.

```
@controller:~$ openstack service list
+-----+-----+
| Name | Type |
+-----+-----+
35fa76edc4a23945a0b1c1183c84f | nova | compute |
6984141534ca1964559fa43413081 | glance | image |
48726065a487a9c4a6828221bcd90 | placement | placement |
4e0bc985f4241976b848b1d35fd66 | keystone | identity |
+-----+-----+
@controller:~$
```



```
@controller:~$ openstack service show 0b935fa76edc4a23945a0b1c1183c84f
-----+-----+
ld      | Value      |
-----+-----+
cription | Rabia OpenStack Compute |
bled     | True       |
         | 0b935fa76edc4a23945a0b1c1183c84f |
e        | nova       |
e        | compute    |
-----+-----+
@controller:~$
```

- Also generate for this to check.

```
@controller:~$ openstack service show ce64e0bc985f4241976b848b1d35fd66
-----+-----+
ld      | Value      |
-----+-----+
bled     | True       |
         | ce64e0bc985f4241976b848b1d35fd66 |
e        | keystone   |
e        | identity   |
-----+-----+
@controller:~$
```

- Now, in the dashboard all these are present.

Usage Summary

Select a period of time to query its usage:
The date should be in YYYY-MM-DD format.

to

Active Instances: 0

Active RAM: 0 Bytes

This Period's VCPU-Hours: 0

This Period's GB-Hours: 0

This Period's RAM-Hours: 0

Usage

[Download CSV Summary](#)

| Instance Name | VCPUs | Disk | RAM | Time since created |
|----------------------|-------|------|-----|--------------------|
| No items to display. | | | | |

Error: Unable to retrieve limits information.

- All services that are related to it are present.

Instances

Images

Key Pairs

Server Groups

Admin

Identity

Limit Summary

Compute

Volume

Network

Usage Summary

Select a period of time to query its usage:

The date should be in YYYY-MM-DD format.

2023-12-30

to

2023-12-31

Submit

Active Instances:

0

Active RAM:

0 Bytes

This Period's VCPU-Hours:

0

This Period's GB-Hours:

0

This Period's RAM-Hours:

0

Usage

Instance Name

VCPU

Disk

RAM

Hypervisors

Instances

Flavors

Images

System

Identity

Hypervisor Summary

VCPU Usage

Used of

Memory Usage

Used 0 Bytes of 0 Bytes

Hypervisor

Compute Host

Hostname

Type

VCPU (used)

VCPU (total)

RAM (used)

RAM (total)

Local Storage (used)

No items to display.